British Columbia Provincial Economic Multipliers And How to Use Them

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Chapter 1: Introduction

The British Columbia government has maintained a provincial Input-Output Model for many years. This model was developed and is updated periodically by BC STATS using data supplied by the Input-Output Division of Statistics Canada. The first model that BC STATS developed had 1974 as its base year. Subsequently, there were models based on data for the years 1979, 1984, 1990 and 1996. The current model, described in this report, is based on 1999 data. Future updates should occur on an annual basis with the release of data from Statistics Canada.

During this period the model has been used for hundreds of studies, including the impacts of the proposed 2010 Vancouver Olympics, the Vancouver Convention Centre, the Kemano Completion Project, and land use planning studies for LRMP's throughout the province. Although economic impacts are not the only reason for undertaking projects or developing specific policies, those impacts are often important considerations and their estimation should play some part in any review of those projects or policies.

Indeed, as government requires its programs to become more accountable for results[1], those programs that claim to produce economic benefits will need to estimate them. Ascertaining whether or not the predicted benefits were achieved may not be easy, but defining their value in an economically valid and systematic way is at least a first step.

In recent years Statistics Canada has been gradually changing its industry classification system from SIC (Standard Industrial Classification) to NAICS (North American Industrial Classification System). The model and results described in this report are the first in B. C. that use data allocated according to this new classification system.

At the finest level of detail the switch from SIC to NAICS is a major change with virtually every activity affected in one way or another. Of particular importance in B. C., for the first time Animal Aquaculture (fish farming) is identified as a separate industry, and at the **Medium Aggregation** level this industry is considered part of *"Crop and Animal Production"*. This seems more appropriate than *"Fishing, Hunting and Trapping"* which is where it was assigned in previous models.

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1 *Enhancing Accountability for Performance: A Framework and an Implementation Plan*, Second Joint Report, Auditor General of British Columbia and Deputy Ministers' Council, April 1996.

However, at the **Medium** and **Small Aggregation** levels, the changes do not appear to make a lot of difference. Nevertheless, the reader is cautioned that some changes in the multipliers from earlier models may be the result of these definitional changes.

The estimation of economic impacts is often a complex and technically challenging task and may involve significant amounts of judgement on the part of the analyst. We often get calls from practising economists or consultants with the question "What is the multiplier for .....?" The purpose of this publication is to try to respond to that question in a way that is helpful and instructive, and yet fair to the discipline, the situation under study, and the ultimate recipients of the information generated. The fact is that sometimes a simple multiplier *is* all that's required, though even in these cases there are subtle nuances and traps that analysts ought to be aware of and avoid. This report provides information generated from the 1999 Provincial Input-Output model, and this data can be used to calculate more than 4500 different multipliers[2] for the BC economy. (Small wonder that we instinctively wince when we get a request for ***the*** *standard multiplier*.) This report also provides explanatory information and example analyses that should promote the correct selection and application of those multipliers.

There are many situations, however, when the best approach to economic impact estimation is not to use a multiplier, but to make use of the input-output model in a project-specific way. A secondary purpose of this report is to help analysts to recognize such situations and to invite them to contact BC STATS to request use of the model for their application.

Chapter 2 of this report provides an overview of the structure of the model and discusses some of the issues and limitations associated with its application. As much as possible we have tried to present the relevant information in non-technical terms, with some technical details provided in Appendices.

Chapter 3 describes the multipliers provided in this report. It is emphasized that different situations call for different multipliers, and the onus is put on the analyst to use the information provided to calculate the most appropriate one for their application. A number of examples are provided to assist this process.

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2 This estimate was arrived at by considering about 89 industry groupings, 3 model configurations, 6 different measures (employment, GDP, etc.) and 3 different ways of combining the information into multipliers depending on the question asked.

Finally, there is a concluding section that describes a number of situations where use of the input-output model itself is much more appropriate than any of the multipliers found in this report.

Chapter 2: The Input-Output Model

Even those of us who are total klutzes in the kitchen know that to make a cake we need a recipe and the appropriate ingredients: flour, eggs, butter, milk, sugar, chocolate, etc. We also need a source of energy (electricity, natural gas, wood, etc.) to bake the cake. We can think of each of these ingredients as an input and the finished product, the cake, as the output.

But, of course, each of these inputs is the output of another recipe or process. For example, eggs are produced by chickens that require grains, vitamins, antibiotics, chicken coops, heat and labour inputs.

The British Columbia Input-Output Model (BCIOM) structures the business sector of the entire British Columbia economy in terms of who makes what and who uses what. In principle, the model contains the recipes for every output of the economy. Such a model is very useful in predicting how an increase in demand for the products of one industry will impact on other industries and therefore on the entire economy.

The Structure of the Input-Output Model

In the input-output model, the economy is simplified - the current 1999 version of the BCIOM assumes that 300 industries make or use 727 commodities. Both of these numbers are arbitrary. Larger numbers would permit more precision in the recipes - if cakes are lumped with bread and cookies, etc., in the category "bakery products", then the recipe will not be for cake, but some weighted average of the recipes for each item in the category. Difficulties in the collection and manipulation of the required information tend to keep the numbers down. Needless to say, earlier input-output models were much smaller, and even the smallest ones were not practical without computers.

Units

In order to avoid complications with units, everything in the BCIOM is measured in dollars. Thus, to return to the cake example, instead of the normal cookbook recipe that might specify 2 eggs, ½ cup of butter, 1 cup of sugar, 2 cups of flour, etc., the BCIOM recipe for a cake might say:

eggs	$0.15
butter	$0.45
sugar	$0.13
flour	$0.06

Mathematically and conceptually, this keeps everything straightforward and simple, but it does introduce a major assumption - that of constant relative prices.

As recipes are normally written, in terms of quantities, older recipes are as valid now as when they were conceived. However, a recipe expressed in dollar terms produces a strange-tasting cake if the relative prices of eggs, butter, sugar and flour change appreciably. Uniform price changes caused by a general inflation rate are not really a problem - in this case we might get a smaller cake from an old recipe, but it would still taste like cake.

In reality, of course, production processes in the economy use real recipes based on actual quantities. When there are relative price changes over time, the BCIOM should be updated to reflect them. If it isn't, the model will overestimate the impacts on commodities that have become relatively cheaper, and underestimate the impacts on commodities that have become more expensive.

Producers' Prices

A question we must ask is, does the 15 cents worth of egg required to bake our cake refer to the price we pay in the grocery store or the price the poultry farmer received for the egg? The price of an egg bought at the local store includes the cost of transportation, wholesale and retail mark-ups and various indirect taxes.

In input-output terminology, *producers' price* is the price of the egg from the farmer's point of view; *purchasers' price* is what the consumer pays. The additional costs - transportation, taxes, mark-ups - which make up the difference between the two types of valuation, are referred to as margins.

The prices in the model are valued in producers' prices - the price the farmer receives for his eggs. In the case of manufactured goods, this would be the price the producer receives for the product at the factory gate. What this means is that the recipe for cake in the BCIOM explicitly includes items like transportation, wholesale trade and retail trade – costs that are incurred between the ingredient producers and the ultimate user.

The MAKE, USE and FINAL DEMAND Matrices

The raw data of the model is organized into three main matrices - *MAKE*, *USE* and *FINAL DEMAND*. The *MAKE* matrix specifies, for each commodity, the industries that produce that commodity. In many cases, the entire production of a given commodity is made by a single industry - for example, all coal is produced by coal mines. However, some commodities are produced by a

number of industries. For example, *Other Meat, Fresh, Chilled, Frozen* (Commodity #65) is provided by three industries: *Animal Production (except Animal Aquaculture), Rendering and Meat Processing from Carcasses,* and *Wholesale trade*. A firm is usually allocated to an industry on the basis of its main product (in dollar terms).

The *USE* matrix provides details about the commodities used by each industry. For example, the *Animal Production (except Animal Aquaculture)* industry requires 89 separate commodity inputs, the five largest of which are *Complete feeds, Hay and straw, Mixed income, Other operating surplus, and Wages and salaries.*

The *FINAL DEMAND* matrix shows the disbursement of commodities to various final users. There are 170 categories that specify consumer expenditures, capital expenditures on machinery and equipment and construction, changes in inventory, government expenditures, exports and imports.

Primary Inputs

Some commodities, principally wages and salaries, operating profits and indirect taxes, are designated as *primary inputs*. These are characterized in the *MAKE* matrix by all zeros (i.e. no industry makes these commodities - in that sense they are "primary"). These commodities are also referred to as *value-added* because, for any given industrial process, they constitute the portion of the output that is not linked to other industries via commodity production. The sum of the value-added for all industries in the economy represents an estimate of the total gross domestic product (GDP) for the economy.

Imports

If we were creating an input-output model for the entire world, there would be no need to specify imports or exports, and our model would merely reflect the inter-industry linkages. Thus, in such a model, activity in the bread sector would necessarily lead to activity in the crop production sector; or activity in the aluminium sector would generate activity in the bauxite sector.

However, in many cases, we are particularly concerned with the activity generated in domestic industries - in the case of the BCIOM, with industries in British Columbia. For this reason imports need to be considered.

The BCIOM accounts for imports by associating a fraction, called the import ratio, with each of the 727 commodities in the database. For example, the import ratio for *Soybeans and other oil seeds* is 1.0, indicating that all soybeans are imported. On the other hand, the import ratio for *Fuelwood and other crude wood*

is 0.0293, indicating that the model will assume that about 97% of the fuelwood used by BC industries is produced in BC. Other examples:

eggs are assumed to be 23% imported
butter is assumed to be 84% imported
sugar is assumed to be 5% imported
flour is assumed to be 75% imported

The import ratios used in the model are the result of studies of inter-provincial and international trade. They may not be correct in each and every instance and they may be out of date, but they do tend to reflect the strengths in the domestic economy.

The Impact Matrix

The *MAKE* and *USE* matrices are combined mathematically[3] to create the impact matrix, which specifies how a unit change in the output of each industry affects the output of every other industry. If import ratios are not taken into account then the resulting impact matrix is said to be "without leakages". Normally, however, these leakages are included in the computation of the impact matrix so that it reflects only the impacts on the domestic economy.

For example, the impact matrix specifies that a $1 increase in the *Furniture and Related Product Manufacturing* (Industry #29 in the **Medium Aggregation**) has a total impact of $1.49 on domestic output, and the ten most affected BC industries are:

Furniture and Related Products Mfg.	$1.017448
Wood Products Mfg.	$0.112137
Wholesale Trade	$0.052588
Logging and Forestry	$0.042795
Finance, Insurance and Real Estate	$0.039973
Travel & enter., advertising & promotion	$0.032394
Operating, office, cafeteria & lab supplies	$0.031530
Professional, Scientific and Technical Svc.	$0.017029
Retail Trade	$0.015697
Electric Power Generation & Trans.	$0.015651

It is probably helpful at this point to emphasize that the above impacts are entirely related to the ***production*** of *Furniture and Related Products*. They do not include any impacts associated with the marketing of the products, or with the

3 The mathematical derivation of the input-output model may be found in the Statistics Canada publication, *The Input-Output Structure of the Canadian Economy* (catalogue #15-510).

transportation of products to markets. Thus, for example, the impacts on *Wholesale and Retail Trade* shown above are not associated with the sale of the furniture products but rather with the relevant margins on purchases that the furniture products industry makes.

Open and Closed Models

The impact matrix just described combines the direct and indirect domestic effects of a unit change in exogenous or final demand. The direct effects are what we start with, and the indirect effects result entirely from backward industrial linkages in the domestic economy. There is a backward linkage from the *Door, Window and Other Millwork* industry to the *Sawmill* industry, and from the *Sawmill* industry to the *Logging* industry. If the impact matrix estimates direct and indirect effects only, we say we are using an *open model*.

There is another kind of effect arising from an increase in domestic economic activity, however, and this is due to the spending of increased household income. These effects are referred to as **induced impacts** in the input-output model.

In the economy, the people who earn this additional income are assumed to spend it in a provincially average kind of way. However, first the amount to be spent is reduced by taxes and savings. Because the commodities bought with this increased household income include imported items, there is further leakage from the domestic economy. At the same time, however, a portion of these domestic expenditures lead to additional production and therefore increased BC personal income which is assumed to be spent on goods and services, etc. The *closed* version of the BCIOM takes these successive rounds of induced impacts into account.

It is important to note that the inclusion of induced impacts is not always appropriate. (In fact, Statistics Canada does not estimate induced impacts at all because of concerns about their misuse.) Great care must be taken not to double-count economic impacts. If total impacts - direct, indirect and induced - were calculated for every industry sector in the BC economy, the end result would add up to more than the entire economy. In general, if the direct impact of a project can be attributed to another industry as an induced impact, it is not appropriate to estimate its induced impacts. For example, the activity generated by resident sports fishermen who receive their wages from the forest industry is considered to be induced activity of the forest sector, as well as direct activity of the sports fishing sector. If, however, a tourist from Alberta fishes in BC while on vacation,

this activity may be attributed to the sports fishing industry. Guidelines regarding whether or not to include induced impacts are discussed in Chapter 3.

With Safety Net and No Safety Net Scenarios.

There are two ways of looking at induced impacts - the *With Safety Net* and *No Safety Net* scenarios. These are also referred to as the *Short-run* and *Long-run* or *No Migration* and *Migration* scenarios and they represent the two extremes of the impacts of a project.

One way of describing the No Safety Net (or Migration or Long-run) scenario is that, based on the assumption that there is no social safety net, those who do not earn wages have no income. All new jobs are assumed to be filled by people who previously earned no income in BC or, in the case of a negative impact, the income of everyone who loses their job drops to zero. Another way of looking at it is that everyone who loses their job leaves the province and every new job is filled by someone who moves into the province from somewhere else. In the long run, if people are out of work in one area, presumably they will eventually move somewhere else in the hope of finding employment.

The With Safety Net (or No Migration or Short-run) scenario assumes that those who lose their jobs stay in the province and collect Employment Insurance or social assistance or use their savings; new jobs are filled by people formerly receiving assistance. In the short run, anyone who loses their job is most likely to stay where they are.

Limitations of the Input-Output Model

Compared to the complexity of actual economic systems, input-output models present a simplified account of economic interdependence. Input-output models are not unique in this because all models of economic behaviour represent a simplification of reality. The following limitations should be considered when reviewing results from the model.

1. The relationships of input-output models are simple proportionalities which imply that ***marginal changes are equal to average changes***. This feature makes input-output models convenient to use; however, under many circumstances, proportional relationships may not be appropriate. For example, economies or diseconomies of scale cannot be represented.

2. ***Increases and decreases show the same proportional impact*** whereas, in reality, the disappearance of a particular expenditure does not generate a slowdown in the economy equal to its total economic impact, unless all

funds originate from abroad. This is because at least some of the amount saved will be re-injected into the domestic economy.

3. Input-output models are static models - ***time is not explicitly represented***. Input-output methodology measures the total economic impacts on major economic variables after an exogenous event has taken place. The model does not calculate the amount of time required for the propagation of all effects.

4. Input-output models are exclusively flow models and ***stocks are not represented***. Indeed, the introduction of the concept of stocks would require explicit representation of time. As a result, it is necessary to assume that all intermediate goods can be produced without additions to capital stock.

5. Supply and demand factors cannot be handled simultaneously. Implicit in input-output models is the assumption that ***supply is perfectly elastic***. Thus, any increase in demand for goods and services would lead the producing industries to increase their output by an equal amount to satisfy that demand. It is also assumed that these producing industries have no difficulty in obtaining the necessary inputs for their new level of output. These inputs include not only the intermediate inputs of domestic goods and services but also labour and imports. If a shortage or bottleneck of economic resources develops in one or more sectors, this may precipitate inflationary activity (i.e. relative price changes), substitution effects or changes in import proportions. Any one of these results could subsequently change the overall economic impact.

6. Another basic assumption is that ***all industries are operating at full capacity*** with regard to employment. Hence, any increase in output would require a further proportional demand for labour services. This assumption implies that no industry will meet a new demand for its goods and services with its existing labour force. Therefore, the employment level in the economy is assumed to change in proportion to the increased output in each industry.

7. Although input-output analysis incorporates the provincial economic structure and linkages, it often ***ignores any economic displacement that may occur in existing industries as new projects are completed***. Economic gains in these new projects should be tempered by an estimation of subsequent contractions or losses in existing plants or industries. Further contraction effects on economic activity may result from the recovery of funds used to finance a particular project, either through increased taxation or repayment of borrowed capital. Any displacement effects

arising from financing a project should be taken into account in an overall project cost-benefit analysis.

8. Input-output models ***do not consider the nature of the expenditure, its social impact, nor the externalities that may be generated***. Hence, one cannot conclude about the social/economic profitability of an investment solely on the basis of the results provided by input-output simulations.

9. ***The industrial structure and linkages are based on 1999 preliminary data***. The choice of year was dictated by the availability of provincial statistics and the database developed by Statistics Canada for the Canadian Interprovincial Model. Use of this data base implicitly assumes that the technology of producing goods and services, input patterns and the relative prices of various goods and services remain unchanged from values in the base year of 1999. It further assumes that there are no new products that might require a different production technology or input mix. Employment impacts, however, do take account of changes in labour productivity and wage rates by incorporating more recent employment information.

Opportunity Costs

Opportunity costs are the costs associated with missed opportunities. This concept is important when evaluating the effect of government expenditures. If the same tax dollars were channelled into another project there would be economic impacts. If those tax dollars were not collected and stayed in the pockets of BC residents instead, they would be recycled into the economy as consumer spending and would also create economic impacts in this way. It may be difficult to evaluate the alternatives, but they should not be ignored.

Chapter 3: Multipliers

Different situations call for different multipliers. Using a multiplier is easy; knowing which multiplier to use can be a challenge. Before using a multiplier to answer a question, it is very important to know exactly what the question is.

If we think of the economy as a pie with each of the various industries having a piece of the pie, one type of question involves estimating the size of the pieces associated with the different industries. For this type of question, it is important to recognize that the pie doesn't get any bigger - what one industry gains, other industries must lose since the shares cannot add up to more than one pie. Questions of this type are called "allocation questions" and to answer them, it is important to use a procedure so that if we applied it in the same way to each industry the shares would add up to 100%. Unfortunately, **the numbers in the tables of this publication cannot be used to answer allocation questions**.

However, there are times when the analyst may want to know the impact of a new development that will increase the size of the economic pie. (Similar reasoning applies to changes that decrease the size of the pie). In this case, the question is about how much bigger the whole pie will get as a result of the new development. This is a fundamentally different question than the allocation question. As will be described below, the numbers in the tables of this report can be used to derive multipliers to answer questions of this kind in a number of ways.

Another consideration is whether to use *Open* or *Closed* model results. The Open Model can always be used - it treats personal spending by wage-earners as exogenous and never leads to contradictions or inconsistent results. Induced impacts are always zero if the Open Model is used.

The Closed Model, however, is more difficult to justify in many situations. For example, it is intuitively dubious to estimate the induced impacts of an activity that would itself be largely driven by consumer spending. (The model, and the tables in this report derived from it, can certainly be used to carry out the required calculations, but interpretation of the results will always be problematic).

Thus for applications which involve exports or capital spending, either the Open or Closed Model can be used and the results interpreted accordingly. However, when changes in demand are caused by domestic personal expenditures, in whole or in part, only the Open Model makes sense.

Determining Which Multiplier to Use

Demand-driven commodity solutions are the "natural" way to use the input-output model. A project is broken down into a set of commodity expenditures that are then run through the model. The numbers in the following tables, however, are *industry* multipliers. They represent the impacts on the entire economy of an increase or decrease in domestic production of $1 (except employment, which is for $1 million in a particular industry). To relate this to the commodity solution, the industry solution approach assumes an average or typical pattern of commodity purchases to produce the required output (the average 1999 "recipe" for each industry as described in Chapter 2).

For each type of impact (output, GDP at factor cost, employment and taxes) direct, "own indirect", total indirect and two types of induced impacts - with and without safety net - are displayed. There is no column for direct output; by definition, this is 1.00.

"Own indirect" refers to indirect impacts of an industry on itself. Industries have indirect linkages not only to other industries but also to other firms within the same industry. When industries are very disaggregated, an industry's linkages to itself are minimal. The more highly aggregated an industry is, the more pronounced the effect. These "internal linkages" are important in understanding the different types of multipliers.

Multipliers for medium and small industry aggregations are provided. There is some overlap between the different aggregations. For example, the *Crop and Animal Production* industry appears on both the small and medium aggregation tables. *Fishing, hunting and trapping* also remains separate from other industries in both aggregations.

The data on which the BCIOM is based is collected by Statistics Canada from firms in each industry with the understanding that the information will remain confidential, so that, for example, one firm in a two-firm industry will not be able to figure out its competitor's statistics by subtracting its own data from the totals. This requirement means that some industries in the large aggregation need to be suppressed. For this reason, only the medium and small aggregation tables are released in this publication. However, it is important to understand that these aggregated results have been developed from a large-aggregation model. Stated simply, a medium aggregation multiplier is computed by disaggregating the assumed direct impact into its large aggregation components (using total 1999 revenues as relative weights), then applying the large aggregation impact matrix, and finally re-aggregating the results for the medium (or small) aggregation

tables. This procedure is more accurate than just working with a medium aggregation impact matrix.

Most industry input is reported in considerable detail. There are, however, several catch-all categories such as office supplies, laboratory supplies, advertising and promotion, etc. which are made up of many input-output commodities. It is not possible to estimate the detailed commodity content of these for each industry, so to handle these inputs the notion of *fictional industries* is used. In the medium aggregation, these are: *55 Operating, office, cafeteria and lab supplies, 56 Travel, entertainment, advertising and promotion* and *57 Transportation margins*. Multipliers for the fictional industries have been included in the tables, but it should be noted that because of their artificial nature, they have no direct employment or GDP.

As mentioned at the beginning of this chapter, different situations require different multipliers. Normally, the numerator will be "total whatever", where *whatever* may be output (which is equivalent to total revenues), or GDP at Factor Cost, or employment, or taxes. The purpose for which the multiplier is needed will determine the denominator. If the analyst knows the "new" revenues attributable to this project then the denominator will just be 1. However, if observation has revealed a total industry revenue increase, then the appropriate denominator will be '1 + Own Indirect Output'.

This is subtle. Consider the following two cases that reveal this distinction.

1. Due to the launch of a new product line, the XYZ Insurance Company is expected to increase its revenues by $20 Million. In this case the appropriate Open Model output multiplier is 1.45. (See industry #42 in the **Medium Aggregation** table.)

2. After a change in regulations concerning the insurance industry, its overall revenues are down by $12 million. In this case the appropriate Open Model output multiplier is 1.45/1.14 = 1.27. (If we used 1.45, we would be overestimating the impacts by counting the secondary impacts on the insurance industry twice.)

Impacts of Wages and Salaries

There may be times when the analyst needs to know the impact generated by personal income. This might arise, for example, when considering the impacts of a change in personal income tax rates. Below are the induced impacts, both with and without safety net, of $1 million of wages and salaries. There are no indirect

impacts associated with wages and salaries. It has been assumed that there is a 25% leakage to items such as taxes and savings.

	With Safety Net	*No Safety Net*
Output	$821,555	$924,382
GDP at Factor Cost	$456,234	$513,337
Employment, 2002	7.86 jobs	8.85 jobs

Retail Trade

It should be noted that the Retail Trade industry refers only to the sales activity itself and does not include impacts on manufacturing and other industries that provide the goods that are being sold. Thus, for example, if for a particular type of store the retail margin is 10% then it takes $10 million in sales to produce $1 million of direct impact on the *Retail Trade* industry. The other $9 million may produce significant impacts on other provincial industries but additional information is required to estimate these. (e.g. What commodities are being sold? Who makes them?, etc.)

The multipliers in this publication can be used to analyze the economic impacts associated with "shopping" in three different cases:

1. Where the commodities being purchased are known and can be identified as production from one industry (or at most a couple). For example, using the situation from the previous paragraph, the items may all be food and we may assume that it is all produced by the *Food Manufacturing* industry[4]. So the impacts generated by this shopping would be determined by applying the appropriate multipliers to two direct activities: $1 million in *Retail Trade*, and $9 million in *Food Manufacturing*.

2. Where the set of items being purchased is known to the model because it is the complete basket of goods purchased by BC residents in the model year (1999 in this case). This is the assumption and premise behind the results of the previous section.

3. Where the items being purchased arise from an assumed "tourist" basket of goods. This is discussed in much greater detail in the following section and in Example 5.

4 Of course, some of the food purchased may be imported into the province. The analyst will need to make this assessment and possibly reduce the $9 million domestic shock accordingly.

Tourist Spending

Tourism is unique among the major industries for a number of reasons. One is that it cannot be found anywhere in the multiplier tables at the end of this report. However, in those tables you can find the industries that are directly impacted when tourists spend money – *Accommodation and Food Services; Transportation; Arts, Entertainment and Recreation Services;* and *Retail Trade.*

So what is the best way to proceed when the impacts of tourist spending are required? The analyst first needs to decide how much is spent on each of these industries and then applies the appropriate multipliers on an individual basis – the total impact is just the aggregate of the individual impacts.

However, there are a couple of additional complications that are unique to Tourism. Firstly, and probably most significant, is that when tourists spend money they must pay commodity taxes on the purchases that they make. For example, if a tourist spends $50 on a meal in a restaurant, some of that money will go to paying provincial taxes and some will go to GST and other federal taxes, and what is left will be a direct impact on the *Food and Beverage Services* sector. The multipliers in this publication can be used to estimate any additional federal or provincial taxes incurred from that point on, but DO NOT automatically estimate what might be called the front-end taxes. Thus before the analyst hits each of the tourist impacted industries he/she should first estimate and subtract out the front-end taxes. At the end of the analysis these amounts can then be added back into the estimates of government revenues. Table 1 below provides average rates for these various taxes.

Table 1: Front-end Tax Rates (per cent)

Industry	GST	Provincial Comm. Taxes	Other Federal Comm. Taxes	Total Front-end Taxes
Accommodation	3.72	6.22	0	9.94
Food & Beverage	6.06	1.37	0	7.43
Local Transport	5.64	0	0	5.64
Recreation	5.09	0	0	5.09
Retail Trade	5.35	13.19[5]	6.47	25.01

5 The astute reader may wonder why this rate is so high given that the nominal PST rate is 7.5%. The reason is that tourists are assumed to buy cigarettes and other tobacco products and the provincial taxes on these products are so high that the weighted average rate on all products that tourists are assumed to buy becomes 13.19%.

The final complication is that when tourists purchase goods, the money does not all go to domestic industries that produce goods nor does it all go to the retail trade sector. As noted earlier, some of it is taken off the top as federal and provincial taxes, some of it goes to the retailer (the retail margin), some of it goes to the wholesaler (the wholesale margin), and what is left goes to the producer, who may be domestic or foreign.

Table 2 below is based on the tax and trade margins associated with an assumed "basket" of tourist goods.

Table 2: Tourist Spending on Goods: Where the Money Goes

	Percentage
Provincial Commodity Taxes	13.2
Federal GST	5.3
Other Federal Taxes	6.5
Retail Margin	28.4
Wholesale Margin	8.2
Production	38.4
Total	**100.0**

The information in this table can be used to estimate the front-end taxes on goods purchased by tourists as well as the direct impacts on the trade industries. Generally, the retail impact would be considered direct whereas wholesale and its spin-offs would be considered indirect. Finally, the amount of domestic production and its impacts (all considered indirect) can be estimated from the following table. For each dollar of production for tourists, the table shows the corresponding BC impacts (as in the general multiplier tables, the employment impacts correspond to $1 million of production for tourists). Note also that not all of the production for tourists occurs in British Columbia – the estimated impacts in the tables below take into account assumptions about the import content of goods purchased by tourists.

Table 3: Industry Multipliers: Production for Tourists

Output			GDP			Employment		
Indirect	SN[6] Induced	NSN Induced	Indirect	SN Induced	NSN Induced	Indirect	SN Induced	NSN Induced
0.33	0.03	0.08	0.15	0.02	0.05	3.7	0.3	0.8

Table 4: Government Revenue Multipliers: Production for Tourists

Federal Government Tax				Provincial Government Tax				Municipal Government Tax			
SN Indir.	NSN Indir.	SN Induc.	NSN Induc.	SN Indir.	NSN Indir.	SN Induc.	NSN Induc.	SN Indir.	NSN Indir.	SN Induc.	NSN Induc.
0.006	0.009	0.002	0.006	0.007	0.007	0.003	0.007	0.001	0.001	0.001	0.002

Examples

Example 1
A new marketing strategy is expected to increase production in the soft drink industry by $1 million. What are the impacts on the BC economy?

Because the tables show the impacts of an increase or decrease of $1 of output, estimating the impacts of the $1 million increase in the output of the soft drink industry is a simple case of adding the direct and indirect multipliers found on row 12 of the **Medium Aggregation** table (induced impacts are not counted because production will be for domestic consumption) and multiplying the sum by $1 million, the magnitude of the increase in output. The total impacts on the BC economy will be:

Output: (1.00 + 0.54) x 1,000,000 = $1,540,000
GDP: (0.41 + 0.19) x 1,000,000 = $600,000
Employment: 2.60 + 3.04 = 5.64 jobs

Provincial Government Revenue: (using multipliers from row 12)

With Safety Net: 0.031 x 1,000,000 = $31,000
Without Safety Net: 0.034 x 1,000,000 = $34,000

6 In these tables, as in the tables at the end of this report, SN stands for "with Safety Net" and NSN stands for "No Safety Net".

Example 2

Suppose example 1 were modified as follows. A new marketing strategy is expected to increase revenues for the soft drink industry with employment in this industry expected to rise by 100. What are the impacts on the BC

First, estimate the employment impacts. The increased revenues are a direct impact as are the 100 additional jobs. The denominator will be *direct*. The inclusion of induced impacts is not appropriate since this involves domestic consumption only. The numerator will be *direct + indirect*.

And so, the employment multiplier is (2.60 + 3.04) ÷ 2.60 = 2.17 and the total employment impact in BC is 100 x 2.17 = 217. A total of 217 jobs (including the 100 direct jobs) are gained as a result of the new marketing strategy.

From the multiplier tables, we see that a $1 million increase in output in the soft drink industry creates 2.6 additional direct jobs. Therefore, it will take $38.5 million to generate 100 direct jobs and the following impacts.

Output: (1.00 + 0.54) x 38,500,000 = $59,290,000
GDP: (0.41 + 0.19) x 38,500,000 = $23,100,000
Provincial Government Revenue:
With Safety Net: 0.031 x 38,500,000 = $1,190,000
Without Safety Net: 0.034 x 38,500,000 = $1,310,000

Example 3

The residential construction sector is losing 200 jobs per year. What is the impact on the BC economy?

First, consider the employment impacts. The 200 jobs include all jobs in construction - both direct and indirect. The denominator will be *direct + own indirect*. Residential construction is driven entirely by domestic consumption, therefore induced impacts are not appropriate. The numerator will be *direct + total indirect*.

Look at the results for construction (row 10) on the **Medium Aggregation** table; the multiplier is (8.48+4.03)÷(8.48+0.05) = 1.47. The total employment impact is 200 x 1.47 = 294. About 94 jobs are lost in the rest of the BC economy.

Next, consider the other impacts on the economy. There are 200 jobs in the direct and own indirect categories. The multiplier for own indirect is 0.05, so 199 of the 200 jobs are direct. From the multiplier tables, we see that a $1 million decrease in output in construction results in 8.48 fewer direct jobs. Therefore, it will take $23.47 million (199÷8.48) to reduce the number of direct jobs by 200 and generate the following impacts:

Output: (1.00 + 0.50) x 23,470,000 = $35,205,000
GDP: (0.40 + 0.22) x 23,470,000 = $14,550,000

Provincial Government Revenue: (using multipliers from row 10)

With Safety Net: 0.060 x 23,470,000 = $1,410,000
Without Safety Net 0.066 x 23,470,000 = $1,550,000

Example 4

The Japanese are going to increase imports of squidgeon (a mythical fish delicacy found along the BC coast). The BC fishing industry will expand and employ 100 additional FTE's. What are the impacts on the rest of the BC economy?

We cannot discern how many of the additional jobs in the fishing industry are direct and how many are indirect, so the denominator of the multiplier will include both *direct and own indirect*.

There is an increase in export activity - new money will be flowing into the province, so it is appropriate to include induced impacts. The numerator will be *direct + indirect + induced*. In the closed model, there are two approaches - the With and Without Safety Net scenarios. A range of the likely impact is estimated using the multipliers from row 3 of the **Medium Aggregation** table.

With Safety Net: (9.39 + 2.71 + 1.32) ÷ (9.39 + 0.03) = 1.42
1.42 x 100 = 142 jobs in total
Without Safety Net: (9.39 + 2.71 + 3.22) ÷ (9.39 + 0.03) = 1.63
1.63 x 100 = 163 jobs in total

Other economic impacts: If there are 100 jobs in the direct and own indirect categories, then there are [9.39÷(9.39+0.03)] x 100 = 99.7 direct jobs. From the multiplier tables, we see that a $1 million increase in output in fishing and trapping results in 9.39 direct jobs. Therefore, it will take $10.62 million to increase the number of direct jobs by 99.7 and generate the following impacts. (The provincial government revenues are estimated using the multipliers from row 3 of the **Medium Aggregation** table.)

With Safety Net:

Output: (1.00 + 0.47 + 0.14) x 10,620,000 = $17,100,000
GDP: (0.41 + 0.15 + 0.08) x 10,620,000 = $6,800,000
Prov Govt Revenue: (0.051 + 0.012) x 10,620,000 = $669,000

Without Safety Net:

Output: (1.00 + 0.47 + 0.34) x 10,620,000 = $19,220,000
GDP: (0.41 + 0.15 + 0.19) x 10,620,000 = $7,965,000
Prov Govt Revenue: (0.055 + 0.030) x 10,620,000 = $903,000

So, the economic impacts of this increase in squidgeon exports are estimated to be:

Output: $17.1 - 19.2 million
GDP: $6.8 - 8.0 million
Employment: 142 - 163 jobs
Prov Govt Revenue: $0.7 - 0.9 million

Example 5

A hypothetical convention centre proposed for Nanaimo is expected to increase tourist spending by $1 million. What are the impacts on the BC

There are a number of steps in the recommended procedure. These are first itemized below and then followed through for one type of impact (on total Output for the NSN case).

1. Somehow the analyst has to begin by allocating the single gross figure for tourist spending ($1 million in this case) to the individual categories (*Accommodation, transportation, food services,* etc.) In the absence of case-specific information, Table 5 is offered as a guide.

2. Use Table 1 to estimate the front-end taxes on these expenditures.

3. Subtract the front-end taxes from the total revenues received by each tourist industry.

4. For all of the tourist expenditure categories except Shopping apply the appropriate multipliers to get the indirect and induced impacts by industry.

5. In the case of Shopping, there is an additional step using Table 2 because the money spent by tourists on goods purchases is actually distributed to 5 distinct destinations:
   - Front-end taxes
   - Retail margins (which go to the retail industry)

- Wholesale margins (which go to the wholesale industry)
- Imported goods
- Domestically produced goods

6. Indirect and induced impacts for *Retail Trade* can be estimated using the appropriate multipliers for that industry. *Wholesale Trade* impacts can be estimated in the same way, except that even the direct impacts on the wholesale trade industry are treated as indirect (from the perspective of the original tourist spending).

7. Indirect and induced impacts of the tourist purchases of domestic goods are estimated using the appropriate multipliers in Tables 3 and 4.

Back to the example. Without further information regarding the pattern of tourist spending, we assume that it is attributable to five tourist categories as suggested in the Vancouver Island row of Table 5 *Distribution of Total Expenditures by BC Resident Tourists*: $210,000 to *Accommodation Services* (industry # 50), $290,000 to *Food & Beverage* (industry # 51), $260,000 to *Local Transportation* (industry # 35), $140,000 to *Recreation* (industry # 49), and $40,000 to *Retail Trade* (industry # 32). (Note that we have left out the 6% of tourist spending on "other expenses", so our estimate will be conservative.)

Table 5: Distribution of Total Expenditures by BC Resident Tourists (per cent)

BCVS Tourism Area	Accom.	Food & Beverage	Local Transport	Recreation	Retail	Other Expenses
1 East BC Rockies	18	34	23	10	5	10
2 West BC Rockies	20	39	15	15	3	7
3 South Thompson-Okanagan	17	35	16	14	5	13
4 Vancouver Coast & Mountains	19	34	14	10	8	15
5 Vancouver Island	21	29	26	14	4	6
6 North Thompson-Okanagan	19	31	14	13	7	15
7 Cariboo	18	32	18	9	3	20
8 Northwest	18	30	21	11	7	12
9 Northeast	13	23	23	8	7	26
10 Victoria	18	32	14	9	9	19
11 Vancouver	15	32	14	9	10	20
12 Whistler	20	27	11	14	13	15

Source: BC Local Area Economic Dependencies and Impact Ratios – 1996, taken from British Columbia Visitor Studies.

Now, using the rates in Table 1 calculate the front-end taxes collected from this increased tourist spending by each category. The remainder of the spending is treated as the direct output impact on each industry.

Tourist Industry	Front-end Taxes	BC share of Front-end Taxes	Output Impact
Accommodation	$20,874	$13,062	$189,126
Food & Beverage	$21,547	$3,973	$268,453
Local Transport	$14,664	$0	$245,336
Recreation	$7,126	$0	$132,874
Retail Trade	$10,004	$5,276	$29,996
Total	**$74,215**	**$22,311**	**$865,785**

Next, use the industry multipliers in the medium aggregation table to estimate the impacts of the remainder on the BC economy. Tourists are those who travel to and stay in places outside their usual environment. Therefore, tourist spending does bring funds into the province from the outside world. Thus, the induced impacts should be considered in this case.

Applying Output multipliers to the output impacts in the above table results in the following table.

Industry	Output Impacts			
	Direct	Indirect	NSN Induced	Total
Accommodation	189,126	86,998	86,998	363,122
Food & Beverage	268,453	136,911	107,381	512,745
Transportation	245,336	125,121	112,854	483,311
Arts, entertainment & Recreation	132,874	90,354	61,122	284,350

As was mentioned earlier, the case of *Retail Trade* is a little more complicated, since more than one industry is directly impacted by tourist spending on this category. According to Table 2 in the "Tourist Spending" section, the total $40,000 tourist spending on *Retail Trade* is split into different taxes and industries as listed below.

Provincial Commodity Taxes	$5,280
Federal GST	$2,120
Other Federal Taxes	$2,600
Retail Margin	$11,360
Wholesale Margin	$3,280
Production for Tourists	$15,360

The total economic impacts of the $11,360 retail trade sector revenue can be estimated using the multipliers for industry # 32 in the **Medium Aggregation**. These multipliers are 0.49 for indirect and 0.53 for NSN induced. Similarly, the total economic impacts of the $3,280 spent in the wholesale trade sector can be estimated by using the multipliers for industry # 31. These multipliers are 0.52 for indirect and 0.46 for NSN induced. In view of the nature of wholesale trade, however, even the direct activity here ($3,280) is treated as indirect.

Finally, the multipliers provided in Tables 3 and 4 can be used to estimate the domestic economic impacts of the production for tourists.

With Safety Net:

Output (0.33 + 0.03) x 15,360 = $5,530
GDP: (0.15 + 0.02) x 15,360 = $2,611
Employment: (3.7 + 0.3) x 0.01536 ≈ 0.06 jobs
Prov. Govt Revenue: (0.007 + 0.003) x 15,360 = $154

Without Safety Net:

Output: (0.33 + 0.08) x 15,360 = $6,298
GDP (0.15 + 0.05) x 15,360 = $3,072
Employment: (3.7 + 0.8) x 0.01536 ≈ 0.07 jobs
Prov. Govt Revenue (0.007 + 0.007) x 15,360 = $215

We can now enlarge the Output Impacts table by including these additional effects associated with shopping by tourists.

Industry	Output Impacts			
	Direct	Indirect	NSN Induced	Total
Accommodation	189,126	86,998	86,998	363,122
Food & Beverage	268,453	136,911	107,381	512,745
Transportation	245,336	125,121	112,854	483,311
Recreation	132,874	90,354	61,122	284,350
Retail Sector	11,360	5,566	6,021	22,947
Wholesale Sector	-	4,986	1,509	6,494
Production	-	5,069	1,229	6,298

In the same fashion, the impact of the affected tourist industries on the BC economy can be estimated for the other parameters of interest, and the complete results are listed in the following table.

Tourist Ind.	Output, $	GDP, $	Employment	Prov Govt Rev., $
Accommodation	312,058 - 363,122	164,540 - 192,908	3.97 - 4.46	15,886 - 21,749
Food & Beverage	451,001 - 512,745	195,971 - 230,869	7.25 - 7.87	16,107 - 22,550
Local Transport	417,071 - 483,311	208,536 - 242,883	7.15 - 7.76	20,853 - 27,478
Recreation	248,174 - 284,350	110,285 - 131,545	3.16 - 3.51	8,105 - 11,959
Shopping	30,597 - 35,739	16,241 - 19,126	0.41 - 0.46	1,171 - 1,700
Total	**1,458,901 - 1,679,267**	**695,573 - 817,331**	**21.94 - 24.06**	**62,122 - 85,436**

Finally, note that the provincial government revenue column in the above table has been calculated only for the internal workings of the BC economy - i.e. after the front-end taxes have been paid. If we include those provincial government revenues then the total provincial government revenue estimate for the scenario under study is $22,311 + 62,122 = $84,433 for the SN case and $22,311 + 85,436 = $107,747 for the NSN case.

Multiplier Changes from the 1996 Tables

It is somewhat difficult to compare two sets of tables each with many numbers in them. On an individual basis, it would appear that some multipliers have increased, some have decreased, some have changed very little, and some have changed quite a lot. Examples of the latter are: the Total Indirect Output multiplier for *Mining and Oil and Gas Extraction* has increased from 0.39 to 0.46; the direct employment multiplier for *Fishing, Hunting and Trapping* has increased from 6.73 PY/$M to 9.39 PY/$M; the direct employment multiplier for *Manufacturing* has decreased from 5.29 PY/$M to 4.27 PY/$M.

There are probably five contributing factors to any changes between the two sets of tables:

1. The change from SIC to NAICS. This change affects almost every category of activity. For example, *Publishing* in the SIC was considered to be part of *Manufacturing;* in NAICS, *Publishing* is included in the new **Small Aggregation** category called *Information and Cultural Industries*. So there would be some changes even if we were just switching from SIC to NAICS in the same year.

2. A change in the source of employment data. Statistics Canada did not provide complementary employment data with the other data needed to construct a provincial input-output model when the 1996 BCIOM and the multiplier tables derived from it were being developed. Fortunately, 1996 was a Census year so information from the 1996 Census was used for this

purpose. Appendix A in the 2001/2002 publication described in some detail how that information was used, given that the industry set in the Census was not the same as the industry set in the BCIOM. This time around, Statistics Canada did release provincial employment estimates for the 300-industry BCIOM set. These were examined for reasonableness, and having passed that test, were adopted for use in the model without any changes.

3. Random noise in the data collection system. Statistics Canada would be in a much better position to comment on this factor because it collects all of the industry information and then manipulates, processes and ensures that it is consistent, by commodity and by industry and across the whole provincial economy. Given the many steps and the inherent complexity of these processes it would be very surprising if some anomalies did not appear in the same data from one year to another.

4. Contracting out of Support Services. If services that are not part of the core business (e.g. administration or transportation) are conducted "in-house" as part of the business then employment in these services is part of the direct employment for that industry. On the other hand, if these services are contracted out to other firms then only the service is purchased and employment in these services would be considered indirect. Total employment may not have changed at all, but some of it would have moved from the direct column to the indirect column. The reverse transition is also possible. Structural changes of this sort will affect the multipliers.

5. Real changes. Notwithstanding the above four reasons why multipliers may have changed, it is possible that some of the changes actually reflect real changes. For example, *Manufacturing* had a direct employment multiplier of about 5.8 in the 1990 BCIOM, it fell to 5.29 in the 1996 BCIOM, and it is now down to 4.27. It would be tempting to say that these changes show some real improvements in labour productivity in provincial manufacturing.

When Not to Use these Multipliers

There are times when the use of the particular multipliers developed in this report is not appropriate.

- When trying to answer industry share questions, e.g. how big is our industry compared to others, when linkages and dependencies are taken into account. To answer these kinds of questions the model needs to be solved in a different way.

- When a recycling rate of 75% is not appropriate. The recycling rate is the fraction of household income that is re-circulated in the BC economy after allowing for leakages due to taxes and savings. It may not be appropriate, for example, if the project labour force is working in BC but actually residing in Alberta, and sending pay-cheques home to their families.

- When the "industry average" production function is not appropriate. When detailed information about project expenditures is known, it is far better to use it rather than the default production functions in the input-output model. The data in the model is based on provincial averages (and for 1999, at that) and is unlikely to be accurate for a specific project.

- When the import ratios for important inputs differ significantly from the BCIOM assumptions.

- When the **Medium** (or **Small**) **Aggregation** industry in the tables is not likely to be a good representation of the industry directly impacted in the study scenario. For example, the dairy industry is part of *Crop and Animal Production* (#1), but the production function ("recipe") for the latter is probably not a good recipe for the dairy industry.

- When it is important to know which industries will be impacted. Each indirect and induced multiplier in this publication represents an aggregate of impacts across all industries in the domestic economy. To discover what these impacts are for particular industries it is necessary to do a simple run of the model.

- Considerable care must be taken not to double-count impacts when a number of multipliers are used to estimate the impacts of a complex vertically-integrated project. For example, it may be known that a proposed new wood processing facility will employ 200 workers in the mill and another 50 workers in the woods to supply the necessary fibre. It may be tempting for the analyst to apply employment multipliers to both these numbers to estimate total impacts. However, any multipliers in this publication for wood processing include fibre supply activities as part of the indirect activity. Consequently, such a naïve procedure would count the workers in the woods twice – once as indirect and again as direct. There are two ways out of this dilemma: either just ignore the 50 loggers and assume that they are adequately captured by the multiplier for the mill or contact BC STATS where the model itself can be run in such a way that it avoids double-counting and yet uses the known information.

Appendix A: Government Revenues

Aside from domestic output, GDP and employment, government revenue is another key factor that we may want to look at in the estimation of economic impacts. Government revenues arise from Personal Income Taxes, Indirect Taxes Less Subsidies, Corporate Income Taxes, and Natural Resource Royalties. In the 1996 model, however, only the first two types of taxes were calculated, while the other two were omitted from the model. The main reason for this was just that the information needed to estimate corporate income taxes and resources royalties was not available. However, in the current 1999 model, provincial corporate taxes have been estimated, by a method described on the following page. Thus, the tax multipliers in this publication **include** provincial corporate income taxes, but **exclude** federal corporate income taxes.

Personal Income Taxes

The calculation of the total personal income taxes is done by applying industry-specific tax rates (PMTM) that range from 0 to 0.24 to the total personal income of each industry. The PMTM are calculated using a formula presented in *British Columbia Local Area Economic Dependencies and Impact Ratios – 1996* (Horne, 1999):

$$\text{Effective Tax Rate (PMTM)} = 0.36 - 11516/(\text{Income} + 24270)$$

The income used in the above formula refers to the average personal income in each industry, which is equal to the total income in each divided by the total number of jobs in that industry. This way of calculating income tax rates is consistent with the progressive tax system in Canada.

As was explained in the section regarding *With and Without Safety Net*, the net changes in personal income are different in these two scenarios, given the same amount of additional income generated by a project, and therefore, so are the corresponding changes in personal income taxes. Conceptually, the direct and indirect impacts on personal income taxes are smaller in the *With Safety Net* scenario, since in this scenario people who lose their jobs can still receive from the social safety net a certain amount of income that is taxable. Hence, we need another set of tax rates that are applicable to the income obtained from safety net. These tax rates, which are called SNT, are calculated using the same formula, with average total income being replaced with safety net income. Therefore, the effective tax rates ($PMTM_{general}$) can be written in a more general way as follows:

$$PMTM_{general} = PMTM - SNT$$

where the second term on the right hand side, SNT, is equal to zero in the *No Safety Net* scenario. Clearly, the personal income taxes collected in these two scenarios will

not be the same due to the difference in the effective tax rates. Subsequently, not only the induced but also the direct and indirect impacts on the government revenues will be different under these two different assumptions.

Indirect Taxes Less Subsidies

Every model solution generates estimates of Indirect Taxes on Products, Subsidies and Indirect Taxes on Production. It is a challenge to allocate shares of each of these to the three levels of government – federal, provincial and municipal, and doing this requires information from outside the BCIOM.

In the case of Indirect Taxes on Products, additional information from Statistics Canada has enabled us to allocate these on an industry-specific basis to PST, GST, Federal and Provincial Gas Taxes, and other indirect taxes on Products. With these estimates in hand it is a simple matter to allocate the shares of Indirect Taxes on Products to the federal and provincial governments. (There are no municipal Indirect Taxes on Products in BC.)

In the case of Subsidies and Indirect Taxes on Production, we have used historical information to distribute these to the three levels of government as follows:

Subsidies: 31.8% Federal, 64.7% Provincial, 3.6% Municipal.
Indirect Taxes on Production: 0% Federal, 49% Provincial, 51% Municipal.

Corporate Income Taxes

Provincial corporate income taxes have been estimated in the 1999 model by assuming that every industry in the BC economy pays these taxes at the same effective rate on their operating surplus (essentially, Revenues less Expenditures before taxes). Total corporate income taxes paid can be found in government documents (e.g. the Budget), and total Operating Surplus can be found in the BCIOM database. Dividing one by the other yields an effective tax rate that can be used to estimate provincial corporate income tax impacts for any situation that results in changes in Operating Surplus.

Note that this procedure has been applied only to Provincial Corporate Income Taxes. It has not been used for Federal Corporate Income Taxes. The latter have not been estimated in the 1999 model. The reason this procedure has not been used for the federal corporate income taxes is that it is difficult to separate these federal taxes by province of origin.

The **Government Revenue Multiplier Tables** in this publication thus include estimates of corporate income taxes in the provincial columns, but do not include any estimates of federal corporate income taxes in the federal columns.

Natural Resource Royalties

These are also a source of government revenues that have not been included in the current 1999 version of the BCIOM and therefore are not included in the Government Revenue Multipliers, due primarily to data limitations.

Appendix B: Industry and Government Revenue Multipliers

Industry Multipliers - Small Aggregation

1999 BCIOM INDUSTRY MULTIPLIERS - SMALL AGGREGATION - 75% RECYCLING RATE

	OUTPUT				GDPF/OUTPUT					EMPLOYMENT (PY/$M) 2002				
Industry	Own Indir	Total Indir	SN Induc	NSN Induc	Direct	Own Indir	Total Indir	SN Induc	NSN Induc	Direct	Own Indir	Total Indir	SN Induc	NSN Induc
1 CROP AND ANIMAL PRODUCTION	0.16	0.72	0.14	0.35	0.40	0.07	0.31	0.08	0.19	11.34	2.40	6.68	1.37	3.32
2 FORESTRY AND LOGGING	0.21	0.76	0.16	0.32	0.45	0.09	0.25	0.09	0.18	3.47	0.73	3.96	1.56	3.05
3 FISHING, HUNTING AND TRAPPING	0.00	0.47	0.14	0.34	0.41	0.00	0.15	0.08	0.19	9.39	0.03	2.71	1.32	3.22
4 SUPPORT ACTIVITIES FOR AGRICULTURE AND FORESTRY	0.00	0.21	0.27	0.67	0.81	0.00	0.08	0.15	0.37	19.26	0.00	1.60	2.63	6.41
5 MINING AND OIL AND GAS EXTRACTION	0.05	0.46	0.12	0.25	0.53	0.02	0.19	0.07	0.14	2.90	0.26	3.10	1.16	2.35
6 UTILITIES	0.00	0.14	0.07	0.14	0.78	0.00	0.06	0.04	0.08	2.52	0.00	1.00	0.65	1.37
7 CONSTRUCTION	0.00	0.50	0.17	0.40	0.40	0.00	0.22	0.09	0.22	8.48	0.05	4.03	1.60	3.87
8 MANUFACTURING	0.12	0.69	0.13	0.28	0.35	0.04	0.28	0.07	0.16	4.27	0.49	3.63	1.29	2.73
9 WHOLESALE TRADE	0.02	0.52	0.20	0.46	0.58	0.01	0.21	0.11	0.26	9.11	0.20	3.80	1.88	4.41
10 RETAIL TRADE	0.01	0.49	0.22	0.53	0.62	0.00	0.20	0.12	0.29	20.65	0.16	3.61	2.07	5.08
11 TRANSPORTATION AND WAREHOUSING	0.14	0.54	0.18	0.41	0.51	0.07	0.24	0.10	0.23	8.57	1.29	4.46	1.73	3.97
12 INFORMATION AND CULTURAL INDUSTRIES	0.08	0.47	0.15	0.33	0.55	0.04	0.18	0.08	0.18	6.15	0.48	3.39	1.45	3.13
13 FINANCE, INSURANCE, REAL ESTATE AND RENTING AND LEASING	0.14	0.45	0.20	0.35	0.60	0.06	0.18	0.11	0.19	3.49	0.90	3.61	1.95	3.34
14 PROFESSIONAL, SCIENTIFIC AND TECHNICAL SERVICES	0.08	0.54	0.22	0.54	0.58	0.04	0.20	0.12	0.30	14.39	1.03	3.89	2.14	5.15
15 ADMINISTRATIVE AND AND OTHER SUPPORT SERVICES	0.02	0.47	0.21	0.52	0.63	0.01	0.19	0.12	0.29	19.23	0.34	3.66	2.03	4.98
16 EDUCATION SERVICES	0.00	0.46	0.25	0.62	0.68	0.00	0.18	0.14	0.34	33.76	0.06	3.12	2.39	5.89
17 HEALTH CARE AND SOCIAL ASSISTANCE	0.00	0.40	0.23	0.56	0.74	0.00	0.16	0.13	0.31	17.75	0.03	2.73	2.24	5.37
18 ARTS, ENTERTAINMENT AND RECREATION	0.03	0.68	0.19	0.46	0.46	0.01	0.27	0.10	0.26	15.70	0.46	6.30	1.80	4.43
19 ACCOMMODATION AND FOOD SERVICES	0.01	0.49	0.17	0.42	0.48	0.00	0.20	0.10	0.23	19.72	0.13	3.66	1.65	4.04
20 OTHER SERVICES (EXCEPT PUBLIC ADMINISTRATION)	0.01	0.38	0.23	0.56	0.68	0.00	0.16	0.13	0.31	22.78	0.16	2.70	2.17	5.35
21 OPERATING, OFFICE, CAFETERIA, AND LABORATORY SUPPLIES	0.01	0.41	0.05	0.11	0.00	0.00	0.19	0.03	0.06	0.00	0.00	3.85	0.44	1.05
22 TRAVEL & ENTERTAINMENT, ADVERTISING & PROMOTION	0.04	1.12	0.12	0.29	0.00	0.00	0.52	0.07	0.16	0.00	0.00	11.26	1.18	2.78
23 TRANSPORTATION MARGINS	0.00	1.29	0.14	0.34	0.00	0.00	0.61	0.08	0.19	0.00	0.00	10.66	1.38	3.23
24 NON-PROFIT INSTITUTIONS SERVING HOUSEHOLDS	0.00	0.44	0.24	0.58	0.64	0.00	0.19	0.13	0.32	18.54	0.00	3.27	2.29	5.58
25 GOVERNMENT SECTOR	0.04	0.46	0.22	0.52	0.61	0.02	0.24	0.12	0.29	11.06	0.43	4.89	2.08	5.01

SN Induc: With Safty Net Scenario. Assumes that new jobs are filled by people formally receiving assistance. Displaced workers receive assistance.
NSN Induc: No Safty Net Scenario. Assumes that people without jobs have zero income.

Industry Multipliers - Medium Aggregation

1999 BCIOM INDUSTRY MULTIPLIERS - MEDIUM AGGREGATION - 75% RECYCLING RATE

	OUTPUT				GDPF/OUTPUT					EMPLOYMENT (PY/$M) 2002				
Industry	Own Indir	Total Indir	SN Induc	NSN Induc	Direct	Own Indir	Total Indir	SN Induc	NSN Induc	Direct	Own Indir	Total Indir	SN Induc	NSN Induc
1 CROP AND ANIMAL PRODUCTION	0.16	0.72	0.14	0.35	0.40	0.07	0.31	0.08	0.19	11.34	2.40	6.68	1.37	3.32
2 FORESTRY AND LOGGING	0.21	0.76	0.16	0.32	0.45	0.09	0.25	0.09	0.18	3.47	0.73	3.96	1.56	3.05
3 FISHING, HUNTING AND TRAPPING	0.00	0.47	0.14	0.34	0.41	0.00	0.15	0.08	0.19	9.39	0.03	2.71	1.32	3.22
4 SUPPORT ACTIVITIES FOR AGRICULTURE AND FORESTRY	0.00	0.21	0.27	0.67	0.81	0.00	0.08	0.15	0.37	19.26	0.00	1.60	2.63	6.41
5 OIL AND GAS EXTRACTION	0.00	0.46	0.08	0.15	0.57	0.00	0.19	0.04	0.09	0.42	0.00	3.36	0.75	1.47
6 MINING (EXCEPT OIL AND GAS EXTRACTION)	0.00	0.43	0.14	0.30	0.50	0.00	0.19	0.08	0.17	4.98	0.02	2.75	1.31	2.86
7 SUPPORT ACTIVITIES FOR MINING AND OIL AND GAS EXTRACTION	0.00	0.61	0.24	0.42	0.47	0.00	0.18	0.13	0.24	5.46	0.00	3.29	2.26	4.06
8 ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	0.00	0.13	0.06	0.12	0.79	0.00	0.06	0.03	0.07	2.10	0.00	0.94	0.56	1.18
9 NATURAL GAS DISTRIBUTION, WATER, SEWAGE AND OTHER SYSTEMS	0.00	0.19	0.11	0.24	0.75	0.00	0.07	0.06	0.13	4.48	0.00	1.28	1.06	2.25
10 CONSTRUCTION	0.00	0.50	0.17	0.40	0.40	0.00	0.22	0.09	0.22	8.48	0.05	4.03	1.60	3.87
11 FOOD MANUFACTURING	0.08	0.69	0.11	0.27	0.33	0.02	0.26	0.06	0.15	4.89	0.25	5.24	1.08	2.59
12 BEVERAGE AND TOBACCO PRODUCT MANUFACTURING	0.07	0.54	0.09	0.20	0.41	0.01	0.19	0.05	0.11	2.60	0.25	3.04	0.85	1.93
13 TEXTILE AND TEXTILE PRODUCT MILLS	0.01	0.25	0.11	0.27	0.49	0.01	0.10	0.06	0.15	9.92	0.25	2.07	1.06	2.61
14 CLOTHING MANUFACTURING	0.02	0.21	0.12	0.29	0.47	0.00	0.09	0.07	0.16	17.60	0.46	2.17	1.14	2.80
15 LEATHER AND ALLIED PRODUCT MANUFACTURING	0.00	0.31	0.18	0.44	0.42	0.00	0.12	0.10	0.24	21.94	0.01	2.08	1.70	4.20
16 WOOD PRODUCT MANUFACTURING	0.08	0.98	0.16	0.32	0.37	0.03	0.39	0.09	0.18	3.05	0.23	4.52	1.54	3.04
17 PAPER MANUFACTURING	0.05	0.82	0.14	0.27	0.27	0.01	0.32	0.08	0.15	2.51	0.13	3.61	1.36	2.61
18 PRINTING AND RELATED SUPPORT ACTIVITIES	0.03	0.48	0.16	0.38	0.47	0.01	0.18	0.09	0.21	8.51	0.26	2.64	1.51	3.66
19 PETROLEUM AND COAL PRODUCTS MANUFACTURING	0.00	0.67	0.08	0.16	0.03	0.00	0.35	0.04	0.09	1.39	0.01	2.39	0.76	1.51
20 CHEMICAL MANUFACTURING	0.03	0.47	0.11	0.23	0.36	0.01	0.22	0.06	0.13	3.69	0.08	2.81	1.02	2.22
21 PLASTICS AND RUBBER PRODUCTS MANUFACTURING	0.02	0.29	0.10	0.25	0.42	0.01	0.12	0.06	0.14	7.05	0.11	1.93	0.99	2.42
22 NON-METALLIC MINERAL PRODUCT MANUFACTURING	0.12	0.61	0.15	0.33	0.39	0.06	0.28	0.08	0.18	5.59	0.31	3.58	1.39	3.12
23 PRIMARY METAL MANUFACTURING	0.01	0.60	0.13	0.27	0.18	0.00	0.26	0.07	0.15	3.31	0.05	3.46	1.20	2.57
24 FABRICATED METAL PRODUCTS MANUFACTURING	0.04	0.27	0.11	0.28	0.47	0.02	0.12	0.06	0.16	7.24	0.32	1.79	1.10	2.70
25 MACHINERY MANUFACTURING	0.01	0.29	0.14	0.32	0.47	0.01	0.12	0.08	0.18	6.72	0.08	2.04	1.33	3.08
26 COMPUTER AND ELECTRONIC PRODUCT MANUFACTURING	0.04	0.42	0.13	0.29	0.37	0.01	0.19	0.07	0.16	4.84	0.14	3.40	1.20	2.78
27 ELECTRICAL EQUIPMENT, APPLIANCE AND COMPONENT MANUFACTURING	0.01	0.31	0.13	0.31	0.27	0.00	0.13	0.07	0.17	6.92	0.06	2.12	1.29	2.98
28 TRANSPORTATION EQUIPMENT MANUFACTURING	0.02	0.21	0.07	0.17	0.36	0.01	0.09	0.04	0.10	3.88	0.15	1.49	0.70	1.66
29 FURNITURE AND RELATED PRODUCT MANUFACTURING	0.02	0.50	0.16	0.39	0.47	0.01	0.21	0.09	0.22	13.66	0.16	3.06	1.56	3.77
30 MISCELLANEOUS MANUFACTURING	0.01	0.27	0.15	0.37	0.52	0.00	0.12	0.08	0.21	13.71	0.08	1.96	1.44	3.56
31 WHOLESALE TRADE	0.02	0.52	0.20	0.46	0.58	0.01	0.21	0.11	0.26	9.11	0.20	3.80	1.88	4.41
32 RETAIL TRADE	0.01	0.49	0.22	0.53	0.62	0.00	0.20	0.12	0.29	20.65	0.16	3.61	2.07	5.08
33 TRUCK TRANSPORTATION	0.18	0.51	0.17	0.43	0.48	0.09	0.24	0.10	0.24	10.30	1.90	4.51	1.67	4.09

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1999 BCIOM INDUSTRY MULTIPLIERS - MEDIUM AGGREGATION - 75% RECYCLING RATE

Industry (continued)	OUTPUT				GDPF/OUTPUT					EMPLOYMENT (PY/$M) 2002				
	Own Indir	Total Indir	SN Induc	NSN Induc	Direct	Own Indir	Total Indir	SN Induc	NSN Induc	Direct	Own Indir	Total Indir	SN Induc	NSN Induc
34 URBAN TRANSIT SYSTEMS	0.03	0.64	0.47	1.10	1.74	0.06	0.31	0.26	0.61	24.24	0.79	5.64	4.50	10.51
35 OTHER LOCAL PASSENGER TRANSPORTATION	0.03	0.51	0.19	0.46	0.51	0.02	0.23	0.11	0.25	22.47	0.74	4.81	1.85	4.37
36 PIPELINE TRANSPORTATION	0.00	0.29	0.09	0.18	0.73	0.00	0.14	0.05	0.10	2.18	0.00	2.38	0.83	1.72
37 AIR, RAIL, WATER AND SCENIC AND SIGHTSEEING TRANS. & SUPPORT	0.11	0.59	0.18	0.39	0.43	0.05	0.25	0.10	0.22	6.43	0.83	4.73	1.69	3.75
38 POSTAL SERVICE AND COURIERS AND MESSENGERS	0.02	0.42	0.23	0.57	0.64	0.01	0.19	0.13	0.31	17.18	0.38	3.93	2.19	5.42
39 WAREHOUSING AND STORAGE	0.02	0.43	0.21	0.48	0.62	0.01	0.20	0.12	0.27	10.32	0.18	3.11	1.98	4.59
40 MOTION PICTURE AND SOUND RECORDING INDUSTRIES	0.01	0.67	0.18	0.45	0.48	0.01	0.25	0.10	0.25	11.43	0.17	4.73	1.77	4.28
41 BROADCASTING AND TELECOMMUNICATIONS	0.25	0.65	0.13	0.31	0.40	0.10	0.26	0.07	0.17	5.70	1.31	4.48	1.28	2.96
42 PUBLISHING INDUSTRIES, INFORMATION SERVICES & D.P. SERVICES	0.02	0.34	0.14	0.28	0.61	0.01	0.13	0.08	0.16	4.03	0.07	2.51	1.37	2.69
43 FINANCE, INSURANCE, REAL ESTATE AND RENTING AND LEASING	0.14	0.45	0.20	0.35	0.60	0.06	0.18	0.11	0.19	3.49	0.90	3.61	1.95	3.34
44 PROFESSIONAL, SCIENTIFIC AND TECHNICAL SERVICES	0.08	0.54	0.22	0.54	0.58	0.04	0.20	0.12	0.30	14.39	1.03	3.89	2.14	5.15
45 ADMINISTRATIVE AND SUPPORT SERVICES	0.02	0.47	0.22	0.54	0.64	0.01	0.19	0.12	0.30	20.43	0.34	3.62	2.10	5.16
46 WASTE MANAGEMENT AND REMEDIATION SERVICES	0.00	0.52	0.14	0.35	0.57	0.00	0.20	0.08	0.19	8.04	0.00	4.05	1.35	3.31
47 EDUCATIONAL SERVICES	0.00	0.46	0.25	0.62	0.68	0.00	0.18	0.14	0.34	33.76	0.06	3.12	2.39	5.89
48 HEALTH CARE AND SOCIAL ASSISTANCE	0.00	0.40	0.23	0.56	0.74	0.00	0.16	0.13	0.31	17.75	0.03	2.73	2.24	5.37
49 ARTS, ENTERTAINMENT AND RECREATION	0.03	0.68	0.19	0.46	0.46	0.01	0.27	0.10	0.26	15.70	0.46	6.30	1.80	4.43
50 ACCOMMODATION SERVICES	0.00	0.46	0.19	0.46	0.57	0.00	0.20	0.10	0.25	15.57	0.04	3.63	1.79	4.39
51 FOOD SERVICES AND DRINKING PLACES	0.00	0.51	0.17	0.40	0.43	0.00	0.21	0.09	0.22	21.77	0.09	3.67	1.58	3.87
52 REPAIR AND MAINTENANCE	0.00	0.41	0.22	0.55	0.68	0.00	0.16	0.12	0.30	20.25	0.03	2.67	2.12	5.23
53 GRANT-MAKING, CIVIC, & PROFESSIONAL AND SIMILAR ORGANIZATIONS	0.00	0.40	0.19	0.47	0.57	0.00	0.16	0.11	0.26	14.46	0.00	3.07	1.82	4.47
54 PERSONAL AND LAUNDRY SERVICES AND PRIVATE HOUSEHOLDS	0.01	0.36	0.24	0.58	0.69	0.00	0.16	0.13	0.32	25.79	0.15	2.69	2.25	5.54
55 OPERATING, OFFICE, CAFETERIA AND LABORATORY SUPPLIES	0.01	0.41	0.05	0.11	0.00	0.00	0.19	0.03	0.06	0.00	0.00	3.85	0.44	1.05
56 TRAVEL, ENTERTAINMENT, ADVERTISING AND PROMOTION	0.04	1.12	0.12	0.29	0.00	0.00	0.52	0.07	0.16	0.00	0.00	11.26	1.18	2.78
57 TRANSPORTATION MARGINS	0.00	1.29	0.14	0.34	0.00	0.00	0.61	0.08	0.19	0.00	0.00	10.66	1.38	3.23
58 NON-PROFIT INSTITUTIONS SERVING HOUSEHOLDS (EX. EDUCATION)	0.00	0.36	0.25	0.60	0.70	0.00	0.15	0.14	0.33	16.94	0.00	2.48	2.38	5.76
59 NON-PROFIT EDUCATION INSTITUTIONS	0.00	0.55	0.23	0.56	0.56	0.00	0.24	0.13	0.31	20.79	0.00	4.38	2.17	5.33
60 HOSPITALS AND RESIDENTIAL CARE FACILITIES	0.00	0.25	0.23	0.58	0.75	0.00	0.10	0.13	0.32	16.14	0.00	2.18	2.23	5.54
61 EDUCATION	0.00	0.20	0.26	0.63	0.83	0.00	0.08	0.15	0.35	16.39	0.03	1.79	2.53	6.01
62 DEFENCE SERVICES	0.00	0.33	0.17	0.41	0.54	0.00	0.13	0.10	0.23	8.79	0.00	2.66	1.66	3.94
63 OTHER MUNICIPAL GOVERNMENT SERVICES	0.03	0.39	0.17	0.42	0.68	0.02	0.18	0.10	0.24	10.30	0.27	3.60	1.64	4.06
64 OTHER PROVINCIAL AND TERRITORIAL GOVERNMENT SERVICES	0.01	0.82	0.20	0.48	0.34	0.00	0.47	0.11	0.26	4.99	0.06	9.69	1.92	4.56
65 OTHER FEDERAL GOVERNMENT SERVICES	0.00	0.37	0.21	0.53	0.69	0.00	0.17	0.12	0.29	11.85	0.04	3.44	2.03	5.03
66 OTHER ABORIGINAL GOVERNMENT SERVICES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Government Revenue Multipliers - Small Aggregation

1999 BCIOM GOVERNMENT REVENUE MULTIPLIERS - SMALL AGGREGATION - 75% RECYCLING RATE

	FEDERAL TAXES				PROVINCIAL TAXES				MUNICIPAL TAXES			
Industry	SN Dir+Ind	NSN Dir+Ind	SN Induc	NSN Induc	SN Dir+Ind	NSN Dir+Ind	SN Induc	NSN Induc	SN Dir+Ind	NSN Dir+Ind	SN Induc	NSN Induc
1 CROP AND ANIMAL PRODUCTION	0.022	0.030	0.010	0.026	0.029	0.032	0.012	0.031	0.011	0.011	0.003	0.008
2 FORESTRY AND LOGGING	0.044	0.054	0.011	0.024	0.042	0.046	0.014	0.028	0.003	0.003	0.004	0.007
3 FISHING, HUNTING AND TRAPPING	0.042	0.053	0.009	0.025	0.051	0.055	0.012	0.030	0.008	0.008	0.003	0.007
4 SUPPORT ACTIVITIES FOR AGRICULTURE AND FORESTRY	0.061	0.086	0.019	0.050	0.036	0.046	0.024	0.060	0.004	0.004	0.006	0.015
5 MINING AND OIL AND GAS EXTRACTION	0.034	0.042	0.008	0.018	0.068	0.071	0.011	0.022	0.012	0.012	0.003	0.005
6 UTILITIES	0.016	0.022	0.005	0.011	0.077	0.079	0.006	0.013	-0.038	0.038	0.001	0.003
7 CONSTRUCTION	0.038	0.053	0.011	0.030	0.060	0.066	0.014	0.036	0.009	0.009	0.004	0.009
8 MANUFACTURING	0.032	0.041	0.009	0.021	0.037	0.040	0.012	0.025	0.006	0.006	0.003	0.006
9 WHOLESALE TRADE	0.050	0.068	0.013	0.034	0.054	0.062	0.017	0.041	0.014	0.014	0.004	0.010
10 RETAIL TRADE	0.042	0.053	0.015	0.039	0.050	0.054	0.019	0.047	0.018	0.018	0.005	0.012
11 TRANSPORTATION AND WAREHOUSING	0.034	0.048	0.012	0.031	0.042	0.047	0.016	0.037	0.012	0.012	0.004	0.009
12 INFORMATION AND CULTURAL INDUSTRIES	0.034	0.045	0.010	0.024	0.051	0.055	0.013	0.029	0.016	0.016	0.003	0.007
13 FINANCE, INSURANCE, REAL ESTATE AND RENTING AND LEASING	0.035	0.043	0.014	0.026	0.076	0.079	0.018	0.031	0.048	0.048	0.005	0.008
14 PROFESSIONAL, SCIENTIFIC AND TECHNICAL SERVICES	0.048	0.066	0.015	0.040	0.044	0.051	0.019	0.048	0.009	0.009	0.005	0.012
15 ADMINISTRATIVE AND AND OTHER SUPPORT SERVICES	0.042	0.056	0.014	0.039	0.045	0.050	0.018	0.046	0.011	0.011	0.005	0.012
16 EDUCATION SERVICES	0.038	0.044	0.017	0.046	0.040	0.043	0.022	0.055	0.015	0.015	0.006	0.014
17 HEALTH CARE AND SOCIAL ASSISTANCE	0.037	0.055	0.016	0.042	-0.008	-0.002	0.020	0.050	0.006	0.006	0.005	0.012
18 ARTS, ENTERTAINMENT AND RECREATION	0.045	0.055	0.013	0.034	0.045	0.049	0.016	0.041	0.012	0.012	0.004	0.010
19 ACCOMMODATION AND FOOD SERVICES	0.033	0.040	0.012	0.031	0.054	0.056	0.015	0.038	0.016	0.016	0.004	0.009
20 OTHER SERVICES (EXCEPT PUBLIC ADMINISTRATION)	0.043	0.056	0.015	0.042	0.045	0.050	0.020	0.050	0.013	0.013	0.005	0.012
21 OPERATING, OFFICE, CAFETERIA, AND LABORATORY SUPPLIES	0.010	0.014	0.003	0.008	0.011	0.013	0.004	0.010	0.003	0.003	0.001	0.002
22 TRAVEL & ENTERTAINMENT, ADVERTISING & PROMOTION	0.026	0.035	0.008	0.022	0.036	0.040	0.011	0.026	0.009	0.009	0.003	0.006
23 TRANSPORTATION MARGINS	0.034	0.046	0.010	0.025	0.049	0.054	0.012	0.030	0.009	0.009	0.003	0.007
24 NON-PROFIT INSTITUTIONS SERVING HOUSEHOLDS	0.059	0.077	0.016	0.043	0.042	0.049	0.021	0.052	0.008	0.008	0.005	0.013
25 GOVERNMENT SECTOR	0.050	0.071	0.015	0.039	0.033	0.041	0.019	0.047	0.004	0.004	0.005	0.012

SN Induc: With Safty Net Scenario. Assumes that new jobs are filled by people formally receiving assistance. Displaced workers receive assistance.
NSN Induc: No Safty Net Scenario. Assumes that people without jobs have zero income.
Note that Government Revenue Multipliers are net of any government subsidies. As a result, if subsidies exceed taxes collected, the combined rate will be negative.

Government Revenue Multipliers - Medium Aggregation

1999 BCIOM GOVERNMENT REVENUE MULTIPLIERS - MEDIUM AGGREGATION - 75% RECYCLING RATE

	FEDERAL TAXES				PROVINCIAL TAXES				MUNICIPAL TAXES			
	SN	NSN	SN	NSN	SN	NSN	SN	NSN	SN	NSN	SN	NSN
Industry	Dir+Ind	Dir+Ind	Induc	Induc	Dir+Ind	Dir+Ind	Induc	Induc	Dir+Ind	Dir+Ind	Induc	Induc
1 CROP AND ANIMAL PRODUCTION	0.022	0.030	0.010	0.026	0.029	0.032	0.012	0.031	0.011	0.011	0.003	0.008
2 FORESTRY AND LOGGING	0.044	0.054	0.011	0.024	0.042	0.046	0.014	0.028	0.003	0.003	0.004	0.007
3 FISHING, HUNTING AND TRAPPING	0.042	0.053	0.009	0.025	0.051	0.055	0.012	0.030	0.008	0.008	0.003	0.007
4 SUPPORT ACTIVITIES FOR AGRICULTURE AND FORESTRY	0.061	0.086	0.019	0.050	0.036	0.046	0.024	0.060	0.004	0.004	0.006	0.015
5 OIL AND GAS EXTRACTION	0.025	0.030	0.005	0.011	0.075	0.077	0.007	0.014	0.007	0.007	0.002	0.003
6 MINING (EXCEPT OIL AND GAS EXTRACTION)	0.035	0.046	0.009	0.022	0.061	0.066	0.012	0.027	0.020	0.020	0.003	0.007
7 SUPPORT ACTIVITIES FOR MINING AND OIL AND GAS EXTRACTION	0.063	0.075	0.016	0.032	0.065	0.069	0.020	0.038	0.006	0.006	0.005	0.009
8 ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	0.014	0.018	0.004	0.009	0.074	0.076	0.005	0.011	0.036	0.036	0.001	0.003
9 NATURAL GAS DISTRIBUTION, WATER, SEWAGE AND OTHER SYSTEMS	0.027	0.036	0.008	0.018	0.088	0.091	0.010	0.021	0.051	0.051	0.002	0.005
10 CONSTRUCTION	0.038	0.053	0.011	0.030	0.060	0.066	0.014	0.036	0.009	0.009	0.004	0.009
11 FOOD MANUFACTURING	0.023	0.032	0.008	0.020	0.028	0.031	0.010	0.024	0.005	0.005	0.002	0.006
12 BEVERAGE AND TOBACCO PRODUCT MANUFACTURING	0.021	0.028	0.006	0.015	0.031	0.034	0.008	0.018	0.005	0.005	0.002	0.004
13 TEXTILE AND TEXTILE PRODUCT MILLS	0.021	0.028	0.008	0.020	0.024	0.026	0.010	0.024	0.003	0.003	0.002	0.006
14 CLOTHING MANUFACTURING	0.016	0.019	0.008	0.022	0.019	0.020	0.010	0.026	0.002	0.002	0.003	0.006
15 LEATHER AND ALLIED PRODUCT MANUFACTURING	0.028	0.035	0.012	0.033	0.023	0.025	0.015	0.039	0.005	0.005	0.004	0.010
16 WOOD PRODUCT MANUFACTURING	0.041	0.051	0.011	0.024	0.042	0.046	0.014	0.028	0.005	0.005	0.004	0.007
17 PAPER MANUFACTURING	0.035	0.044	0.010	0.020	0.049	0.053	0.012	0.024	0.010	0.010	0.003	0.006
18 PRINTING AND RELATED SUPPORT ACTIVITIES	0.036	0.051	0.011	0.028	0.031	0.037	0.014	0.034	0.004	0.004	0.003	0.008
19 PETROLEUM AND COAL PRODUCTS MANUFACTURING	0.021	0.026	0.005	0.012	0.042	0.044	0.007	0.014	0.008	0.008	0.002	0.003
20 CHEMICAL MANUFACTURING	0.025	0.033	0.007	0.017	0.046	0.049	0.009	0.021	0.011	0.011	0.002	0.005
21 PLASTICS AND RUBBER PRODUCTS MANUFACTURING	0.022	0.030	0.007	0.019	0.024	0.027	0.009	0.023	0.003	0.003	0.002	0.006
22 NON-METALLIC MINERAL PRODUCT MANUFACTURING	0.034	0.046	0.010	0.024	0.042	0.047	0.013	0.029	0.007	0.007	0.003	0.007
23 PRIMARY METAL MANUFACTURING	0.030	0.040	0.009	0.020	0.037	0.041	0.011	0.024	0.008	0.008	0.003	0.006
24 FABRICATED METAL PRODUCTS MANUFACTURING	0.025	0.035	0.008	0.021	0.024	0.028	0.010	0.025	0.003	0.003	0.003	0.006
25 MACHINERY MANUFACTURING	0.032	0.045	0.009	0.024	0.027	0.032	0.012	0.029	0.004	0.004	0.003	0.007
26 COMPUTER AND ELECTRONIC PRODUCT MANUFACTURING	0.028	0.040	0.009	0.022	0.027	0.031	0.011	0.026	0.003	0.003	0.003	0.006
27 ELECTRICAL EQUIPMENT, APPLIANCE AND COMPONENT MANUFACTURING	0.030	0.042	0.009	0.023	0.022	0.027	0.012	0.028	0.004	0.004	0.003	0.007
28 TRANSPORTATION EQUIPMENT MANUFACTURING	0.016	0.022	0.005	0.013	0.019	0.021	0.006	0.015	0.002	0.002	0.002	0.004
29 FURNITURE AND RELATED PRODUCT MANUFACTURING	0.031	0.041	0.011	0.029	0.028	0.032	0.014	0.035	0.004	0.004	0.004	0.009
30 MISCELLANEOUS MANUFACTURING	0.028	0.038	0.010	0.028	0.024	0.028	0.013	0.033	0.003	0.003	0.003	0.008
31 WHOLESALE TRADE	0.050	0.068	0.013	0.034	0.054	0.062	0.017	0.041	0.014	0.014	0.004	0.010
32 RETAIL TRADE	0.042	0.053	0.015	0.039	0.050	0.054	0.019	0.047	0.018	0.018	0.005	0.012
33 TRUCK TRANSPORTATION	0.045	0.059	0.012	0.032	0.074	0.079	0.015	0.038	0.010	0.010	0.004	0.009

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1999 BCIOM GOVERNMENT REVENUE MULTIPLIERS - MEDIUM AGGREGATION - 75% RECYCLING RATE

	FEDERAL TAXES				PROVINCIAL TAXES				MUNICIPAL TAXES			
Industry (continued)	SN Dir+Ind	NSN Dir+Ind	SN Induc	NSN Induc	SN Dir+Ind	NSN Dir+Ind	SN Induc	NSN Induc	SN Dir+Ind	NSN Dir+Ind	SN Induc	NSN Induc
34 URBAN TRANSIT SYSTEMS	-0.329	-0.284	0.032	0.082	-0.805	-0.787	0.041	0.098	-0.030	-0.030	0.010	0.024
35 OTHER LOCAL PASSENGER TRANSPORTATION	0.038	0.044	0.013	0.034	0.068	0.071	0.017	0.041	0.022	0.022	0.004	0.010
36 PIPELINE TRANSPORTATION	0.021	0.027	0.006	0.013	0.063	0.065	0.008	0.016	0.027	0.027	0.002	0.004
37 AIR, RAIL, WATER AND SCENIC AND SIGHTSEEING TRANS & SUPPORT	0.040	0.054	0.012	0.029	0.052	0.057	0.015	0.035	0.011	0.011	0.004	0.009
38 POSTAL SERVICE AND COURIERS AND MESSENGERS	0.049	0.066	0.016	0.042	0.039	0.046	0.020	0.050	0.007	0.007	0.005	0.013
39 WAREHOUSING AND STORAGE	0.048	0.067	0.014	0.036	0.064	0.071	0.018	0.043	0.031	0.031	0.005	0.011
40 MOTION PICTURE AND SOUND RECORDING INDUSTRIES	0.038	0.053	0.013	0.033	0.042	0.048	0.016	0.040	0.011	0.011	0.004	0.010
41 BROADCASTING AND TELECOMMUNICATIONS	0.023	0.033	0.009	0.023	0.030	0.033	0.012	0.028	0.008	0.008	0.003	0.007
42 PUBLISHING INDUSTRIES, INFORMATION SERVICES & D P SERVICES	0.035	0.044	0.010	0.021	0.061	0.064	0.012	0.025	0.021	0.021	0.003	0.006
43 FINANCE, INSURANCE, REAL ESTATE AND RENTING AND LEASING	0.035	0.043	0.014	0.026	0.076	0.079	0.018	0.031	0.048	0.048	0.005	0.008
44 PROFESSIONAL, SCIENTIFIC AND TECHNICAL SERVICES	0.048	0.066	0.015	0.040	0.044	0.051	0.019	0.048	0.009	0.009	0.005	0.012
45 ADMINISTRATIVE AND SUPPORT SERVICES	0.043	0.057	0.015	0.040	0.043	0.049	0.019	0.048	0.010	0.010	0.005	0.012
46 WASTE MANAGEMENT AND REMEDIATION SERVICES	0.032	0.044	0.010	0.026	0.057	0.061	0.012	0.031	0.014	0.014	0.003	0.008
47 EDUCATIONAL SERVICES	0.038	0.044	0.017	0.046	0.040	0.043	0.022	0.055	0.015	0.015	0.006	0.014
48 HEALTH CARE AND SOCIAL ASSISTANCE	0.037	0.055	0.016	0.042	-0.008	-0.002	0.020	0.050	0.006	0.006	0.005	0.012
49 ARTS, ENTERTAINMENT AND RECREATION	0.045	0.055	0.013	0.034	0.045	0.049	0.016	0.041	0.012	0.012	0.004	0.010
50 ACCOMMODATION SERVICES	0.041	0.055	0.013	0.034	0.068	0.074	0.016	0.041	0.024	0.024	0.004	0.010
51 FOOD SERVICES AND DRINKING PLACES	0.029	0.033	0.011	0.030	0.046	0.048	0.014	0.036	0.013	0.013	0.004	0.009
52 REPAIR AND MAINTENANCE	0.046	0.059	0.015	0.041	0.044	0.050	0.019	0.049	0.011	0.011	0.005	0.012
53 GRANT-MAKING, CIVIC, AND PROFESSIONAL & SIMILAR ORGANIZATIONS	0.038	0.052	0.013	0.035	0.054	0.059	0.016	0.042	0.014	0.014	0.004	0.010
54 PERSONAL AND LAUNDRY SERVICES AND PRIVATE HOUSEHOLDS	0.042	0.053	0.016	0.043	0.045	0.049	0.020	0.052	0.014	0.014	0.005	0.013
55 OPERATING, OFFICE, CAFETERIA AND LABORATORY SUPPLIES	0.010	0.014	0.003	0.008	0.011	0.013	0.004	0.010	0.003	0.003	0.001	0.002
56 TRAVEL, ENTERTAINMENT, ADVERTISING AND PROMOTION	0.026	0.035	0.008	0.022	0.036	0.040	0.011	0.026	0.009	0.009	0.003	0.006
57 TRANSPORTATION MARGINS	0.034	0.046	0.010	0.025	0.049	0.054	0.012	0.030	0.009	0.009	0.003	0.007
58 NON-PROFIT INSTITUTIONS SERVING HOUSEHOLDS (EX. EDUCATION)	0.062	0.084	0.017	0.045	0.042	0.050	0.022	0.054	0.007	0.007	0.006	0.013
59 NON-PROFIT EDUCATION INSTITUTIONS	0.055	0.067	0.015	0.041	0.043	0.048	0.020	0.050	0.009	0.009	0.005	0.012
60 HOSPITALS AND RESIDENTIAL CARE FACILITIES	0.052	0.074	0.016	0.043	0.031	0.040	0.020	0.052	0.002	0.002	0.005	0.013
61 EDUCATION	0.062	0.087	0.018	0.047	0.031	0.041	0.023	0.056	0.001	0.001	0.006	0.014
62 DEFENCE SERVICES	0.041	0.058	0.012	0.031	0.028	0.035	0.015	0.037	0.002	0.002	0.004	0.009
63 OTHER MUNICIPAL GOVERNMENT SERVICES	0.044	0.060	0.012	0.032	0.035	0.041	0.015	0.038	0.003	0.003	0.004	0.009
64 OTHER PROVINCIAL AND TERRITORIAL GOVERNMENT SERVICES	0.045	0.063	0.014	0.035	0.035	0.042	0.017	0.042	0.008	0.008	0.004	0.011
65 OTHER FEDERAL GOVERNMENT SERVICES	0.050	0.072	0.014	0.039	0.037	0.045	0.018	0.047	0.008	0.008	0.005	0.012
66 OTHER ABORIGINAL GOVERNMENT SERVICES	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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